CSE201 Advanced Programming Section-A
Instructor: Vivek Kumar
Lab Assignment 04
25th November 2021
**Due Date 11:59 PM 29th November 2021**

IMPORTANT INSTRUCTIONS

This assignment is a take-home lab assignment. No extensions whatsoever will be provided. Any submission after the deadline will not be evaluated. If there is any ambiguity or inconsistency in a question, please seek clarification from the teaching staff. Please read the entire text below very carefully before starting its implementation.

Plagiarism: All submitted lab assignments are expected to be the result of your individual effort. Any plagiarism case is detected, it will be dealt with as per IIITD plagiarism policy and without any relaxations: https://www.iiitd.ac.in/sites/default/files/docs/education/AcademicDishonesty.pdf *Please note that you are not allowed to discuss the lab assignment's design/solution (e.g. classroom page discussions, etc.). Anyone who is found doing this will be treated as a plagiarism case. No excuses!*

NOTE: We won't respond to any query because you missed the read the description carefully. We will ONLY respond to valid questions. Make sure you ask all your doubts in advance and not at the last minute.

Hop-n-Win
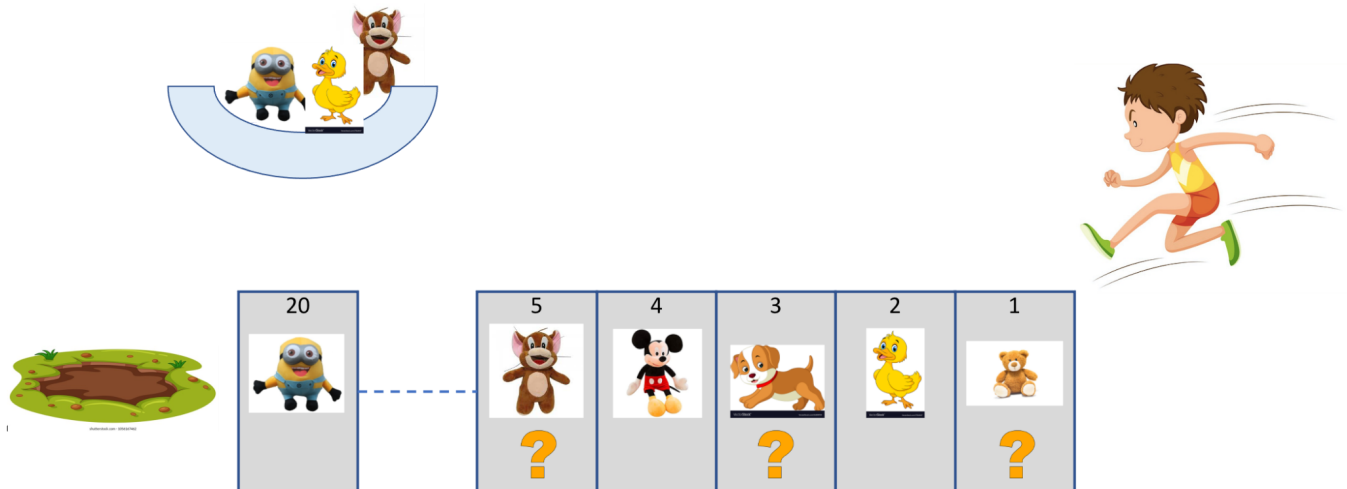
Pictorial Representation of how you can play Hop-n-Win

Assignment Description

Although we are providing a simple test case, it is really simple to play this game. The rules of the game are exactly as shown in the above picture.

You **must** use the following OOP concepts in this assignment to obtain marks: a) classes and objects, b) class relationships, c) **exception handling at all appropriate places, d) object cloning and e) generic programming**. **Whenever an exception is generated, you should catch that exception and redo the execution step that generated the exception.**

This is a single-player game with a really simple objective: the player gets 5 chances to hop and land on the carpet of tiles. Every time the player lands on a random tile, s/he may win a soft toy. The player stores all the soft toys he has won in a bucket. Once the player has hopped five times, the game ends after listing out the details of the soft toys won by the player.

1. Tile Carpet
As shown in the picture, the carpet has 20 tiles. Each tile contains a unique soft toy. You can use your imagination to have a unique soft toy stored at each tile. If the player lands on an even-numbered tile, he directly wins the soft toy stored at that tile, otherwise, the player has to solve a question. In this case, the soft toy is won only in case the player's answer was correct. There is also a possibility that the player is too energetic and jumps really long to land into the muddy puddles at the end of the tile carpet.

2. Question Solving using a Calculator
The game contains a generic calculator for calculating either the result of the division of two integers or for calculating the result of the concatenation of two strings. It doesn't work on any other data types. If the player lands on an odd-numbered tile, the game asks the player if he would like to answer a question based on integer operation or string operation. If the player's choice is an integer operation, the game will generate a pair of random integers (all integers supported). The game will then ask the player to enter the result of the division of these two integers. The game will then pass these two integers to the generic calculator to verify the player's result. If the player's choice is string operation, the game will generate a pair of random strings of length four. The game will then ask the player to enter the result of the concatenation of these two strings. The game will then pass these two strings to the generic calculator to verify the player's result. If the player's calculation matches that of the calculator, the player will win the soft toy.

3. Bucket to Store Soft Toys
Every time the player wins a soft toy at any tile, the tile will create a clone of its soft toy and then hand it over to the player to store it in his bucket. At the end of the game, the game will simply display all the soft toys collected by the player.

Sample test case:

Hit enter to initialize the game

Game is ready

Hit enter for your first hop

You are too energetic and zoomed past all the tiles. Muddy Puddle Splash!

Hit enter for your second hop

You landed on tile 5

Question answer round. Integer or strings?

integer

Calculate the result of 2000 divided by 100

20

Correct answer

You won a Jerry soft toy

Hit enter for your third hop

You landed on tile 2

You won a Donald Duck soft toy

Hit enter for your fourth hop

You landed on tile 1

Question answer round. Integer or strings?

string

Calculate the concatenation of strings abCD and ZxyL

abcdZxyL

Incorrect answer

You did not win any soft toy

Hit enter for your fifth hop

You landed on tile 4

You won a Mickey Mouse soft toy

Game Over

Soft toys won by you are:

Jerry, Donald Duck, Mickey Mouse